ExxonMobil
ExxonMobil Environmental and Property Solutions Company
Park & Brunswick Avenue
Building 7 – Site Remediation
Linden, New Jersey 07036

Maureen P. Forlenza
Bayway Team Lead Project Manager

Date: March 29, 2022

ExxonMobil

Charles E. Zielinski
State of New Jersey
Department of Environmental Protection
Site Remediation Program
Bureau of Case Management
Mail Code 401-05F
PO Box 420
Trenton, NJ 08625-0420

Re: Bayway Refinery Complex Site Remediation:
Response to NJDEP Comments
Revised Feasibility Study Report Addendum,
Technical Impracticability Report, and
Pilot Program Completion Report
Investigative Area of Concern A18 (Pitch)
Bayway Refinery
1400 Park Avenue
Linden, Union County, New Jersey
SRP PI# 008282

Dear Mr. Zielinski:

ExxonMobil is in receipt of the New Jersey Department of Environmental Protection's (NJDEP) January 28, 2022 comments on the Technical Impracticability Report, Pilot Program Completion Report, and Revised Feasibility Study Report Addendum, dated February 22, 2021 for Investigative Area of Concern A18 (Pitch) at the Bayway Refinery Complex. Below are the NJDEP's comments followed by ExxonMobil's responses. Please note that Mike Renzulli, the License Site Remediation Professional, has reviewed and approved these responses.

Department Comment:

ExxonMobil asserts that it is technically impracticable to treat or remove free product and residual product from the entire area of concern (AOC), based on: Infrastructure- Salt Water Line (SWL), Crude Oil Boat Lines, Inter-Refinery Pipeline (IRPL), IAOC 17 The Caverns; Site Conditions- surface water bodies (Morses Creek and Poly Ditch), accessibility, Pitch material which is compressible, potential risk for worker safety, disrupting refinery operations, and restricted areas.

N.J.A.C. 7:26E-5.1(e) states: "The person responsible for conducting the remediation shall treat or remove free product and residual product to the extent practicable, or contain free product and residual product when treatment or removal is not practicable." By definition, not practicable or impracticable means "impossible in practice to do or carry out".

Response:
The Department's Technical Impracticability (TI) Guidance Document states that "*TI is a condition where remediation of ground water to the applicable standards is not feasible from an engineering perspective because of limitations in the ground water remediation system engineering methods or technologies available at the time the remedy is being designed.*" The 1993 United States Environmental Protection Agency (USEPA) guidance document, USEPA Office of Solid Waste and Emergency Response Directive 9234.2-25, which is referenced in the Department's TI Guidance document states "*...a TI determination involves a consideration of engineering feasibility and reliability in attaining media cleanup standards, as well as situations where remediation may be technicaly possible, but the scale of the operations required may be of such magnitude and complexity that the remedial alternative would be impracticable.*"

The Merriam-Webster dictionary defines *impracticable* as "incapable of being performed or accomplished by the means employed or at command". Synonyms for *impracticable* listed by Merriam-Webster include "impractical, inoperable, nonpractical, unserviceable, unusable, unworkable, and useless".

The definition of the word *impracticable* provided by the Department in the January 28, 2022, electronic correspondence is inconsistent with the Department's own TI Guidance Document. It should be noted that the word "impossible" is not used in the Department's TI Guidance Document or Extractable Petroleum Hydrocarbon (EPH) Guidance Document which also addresses TI considerations. The Department's January 28, 2022, electronic correspondence went on to cite the definition of *impracticable* from the TI Guidance Document, so it is unclear which definition of this word is being applied in the decision to reject the TI determination for Investigative Area of Concern (IAOC) A18.

Department Comment:

> The Department's EPH guidance offers some information for scenarios where TI may be appropriate. *There are circumstances where it may be technically impracticable to completely remediate free product and residual product to the applicable EPH product limit in soil. Common impediments are physical obstacles that inhibit or preclude accessibility to the product.* Such impediments may include existing large buildings and underground utility infrastructure.

Response:
The Department's EPH Guidance also states that the Department recognizes that compliance with the EPH product limit may be impracticable for meeting the requirements at N.J.A.C 7:26E-5.1(e) to treat or remove free product and residual product at large or complex non-residential sites including refineries and petroleum storage facilities that extend over multiple acres with multiple AOCs. The Department's January 28, 2022, electronic correspondence focused only on physical obstacles such as buildings and underground utilities as the basis for the TI determination. The Department failed to consider that accessibility to the contamination in question is precluded by more than just buildings and underground utilities as presented in the February 22, 2021 TI Report included the following considerations:

1. The entire IAOC is part of an operational area of the BRC which aligns with what the Department considers a "large or complex site" as per the Department's EPH Guidance. Although this IAOC is not developed, it is surrounded by Morses Creek and bisected by the Poly Ditch, which are operational water bodies for the BRC. These water bodies inhibit accessibility to the contamination in question, and they themselves cannot be altered or inhibited during the remediation.
2. Although buildings and underground utilities are not present in IAOC A18, above-ground refinery infrastructure including a salt water line, crude oil boat lines, and inter-refinery pipelines are physical obstacles that inhibit or preclude accessibility to the contamination in question.

3. The soft and compressible surface and subsurface materials inhibit accessibility to the area in that these conditions limit the machinery that can be used for remediation and the depth that can be accessed.

The Department's EPH Guidance Document goes on to state that remediation of sites that meet the criteria stated above "may involve long-term remedial actions that may delay full compliance with the requirement to treat or remove free product and residual product, or it may involve remedial actions that include some form of containment and active remedial actions for soil and other media". The capping/containment remedy have been proposed in the Revised Feasibility Study Report (RFSR) and TI Report with the understanding that the remedial requirements may change when the BRC shuts down per the Administrative Consent Order and the NJDEP-approved Remediation Strategy Road Map.

Department Comment:

Currently, Department TI guidance for soil is limited to the information outlined in Section 4.2.2 of the Department's EPH guidance, as stated above. The 2013 Department Technical Impracticability Guidance states that it is applicable to ground water conditions only. However, the general TI concept for ground water offers the same context for which the Department evaluates TI claims for free product and residual product: *TI is a condition where remediation [of ground water] to the applicable standards is not feasible from an engineering perspective because of limitations in the [ground water] remediation system engineering methods or technologies available at the time the remedy is being designed.* This guidance also suggests that future updates to the document may include other media, and that the investigator could expect to use the same process outlined therein to evaluate whether a TI determination for other media is supported.

Response:

An electronic correspondence from the Department Case Manager dated August 14, 2019 stated that the data presented in the RFSR and at the June 18, 2019 meeting demonstrated the technical challenges associated with implementing certain remedial actions at IAOC A18. However, a *TI Report* and *Pilot Study Summary Report* were necessary to formally document the technical impracticability of implementing a removal or treatment remedial action for IAOC A18. The Department's TI Guidance Document addresses remediation of ground water only, but the same considerations were used to support a TI determination for soil, sediment, and ground water in IAOC A18 as requested by the Department Case Manager.

The general TI concept for ground water was applied in the TI Report to the assertion that removal or treatment of free and residual product in IAOC A18 is impracticable. Removal or treatment of free and residual product was determined to be impracticable because the entire extent of product could not be addressed based on both limitations in remediation methods and technologies, and current refinery operations. Because product would be left in place, particularly in areas where workers could be exposed (i.e., around refinery infrastructure), an ongoing source of impacts to human health and the environment would be present and would need to be addressed by other means such as capping and containment. If removal/treatment of some product from IAOC A18 would still warrant the use of a containment remedy for the remaining product, a containment remedy was determined to be a more practicable option for all the product present in IAOC A18.

Precedent for implementing a containment remedy for a large area of free product exists at the BRC at the Sludge Lagoon Operable Unit (SLOU; IAOC L). A containment remedy has been successfully implemented at this area, as documented in multiple reports submitted to the Department including the Semi-Annual Progress Reports (SAPRs). Similar to the SLOU, removal or treatment of a portion of the free and residual

product is technically possible, but the scale of the operations required would be of such magnitude and complexity that these remedial alternatives would be impracticable. This determination is consistent with the United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response Directive 9234.2-25, as cited in the Department's TI Guidance document.

Department Comment:

While technical challenges are present at this IAOC, the Department contends it is possible to access and remediate the majority of the impacted areas for which require treatment or removal of EPH free product and residual product, pursuant to N.J.A.C. 7:26E-5.1(e). Remedial actions in the form of containment should be considered only where removal or treatment are not practicable, and the Department does not agree that the removal of free product or residual product is technically impracticable for the entirety of IAOC 18. This approach is consistent with guidance that the Bureau of Environmental Evaluation and Risk Assessment (BEERA) has routinely provided when evaluating the potential for TI at other sites in New Jersey. Consequently, the selected remedy of containment is not protective of human health and the environment, as levels of EPH and other contaminants would remain on-site in excess of applicable remediation standards or screening criteria. Generally, the containment remedial action would not be in compliance with requirements of N.J.A.C. 7:26E-5.

Response:

The requirement to remediate what is "possible" versus what is "practicable" needs to be clarified by the Department. It was never argued that removal or treatment of any portion of the free and residual product at IAOC A18 was "impossible" – a word that is not used in either the Department's EPH Guidance or TI Guidance. It has been contended that it is currently impracticable to remove or treat product based on the criteria specified in these guidance documents. The selected remedy is protective of human health and the environment in that

- Free and residual product and impacted soil would be isolated from direct contact by receptors (human and ecological);
- LNAPL and impacted ground water would be prevented from migrating to Morses Creek; and
- A capping and containment remedy would pose less impact on the surrounding community (i.e., truck traffic, air emissions, generation of hazardous and non-hazardous wastes) than a removal/treatment remedy.

The Department's EPH Guidance also states that the Department recognizes that compliance with the EPH product limit may be impracticable for meeting the requirements of N.J.A.C 7:26E-5.1(e) to treat or remove free product and residual product at large or complex non-residential sites including refineries and petroleum storage facilities that extend over multiple acres with multiple AOCs. The Bayway Refinery Complex is a 1,300-acre complex non-residential refinery and meets the criteria defined in the Department's EPH Guidance.

Department Comment:

As a result, the Department does not agree that it is technically impracticable to implement a removal action to address free product and residual product and collocated contaminants for IAOC 18, therefore, the request to vary from N.J.A.C. 7:26E-5.1(e) is not technically supported or recommended.

For the human exposure and wetland transition areas, the Department acknowledges that multiple infrastructure appurtenances may impede the remediation of EPH free product and residual product at some locations. Phillips 66 (P66) has previously required a 40-foot buffer centered on the SWL, IRPL, and Crude Oil Boat lines (20-feet on either side of the structures), where excavation activities are currently prohibited. The Department understands these areas will require special consideration for TI, and generally agrees with the assertion that pitch material and impacted soils that are located beneath or immediately adjacent to the active refinery infrastructure may be technically impracticable to remediate at this time.

The Department recommends ExxonMobil provide additional detailed figures differentiating those areas that are inaccessible and encumbered by infrastructure appurtenances, and those that are not, and the RFSRA should include a more comprehensive discussion of removal action alternatives (i.e., remedial excavation strategies). ExxonMobil should also consider that a combination of the remedial alternatives may achieve remediation goals, as well as satisfy the requirements of N.J.A.C. 7:26E-5 in IAOC 18.

Response:
Figures provided in the TI Report will be updated and submitted under separate cover.

Department Comment:

ExxonMobil indicates that LNAPL is present in the Pitch area of the IAOC, GMW-749 in the Mudflat Area, and periodically in GMW-229 in the adjacent IAOC 17 (to the north). Based on the chromatographic fingerprinting analyses performed, ExxonMobil contends that although the LNAPL and Pitch Material were similar in composition, the source of LNAPL in monitoring wells in IAOC A18, and GMW-229 in IAOC A17, has not been determined. In addition, ExxonMobil contends that GMW-650 and GMW-211R do not appear to be from the same source. The Department asserts that if the source of the LNAPL throughout the IAOC has not yet been determined, it is also not conclusive that the Pitch Material is not the source. As such, it is possible that the removal of the free product and residual product from this IAOC may also reduce the occurrence and presence of LNAPL in this part of the site. In addition, each Department capping guidance states that any capping remedy must comply with N.J.A.C. 7:26E-5.1(e).

Response:
Because the LNAPL and Pitch Material are collocated, a remedy (removal, treatment, or containment) selected to address Pitch Material would also address LNAPL. The remedy proposed in the RFSR and TI Report (capping and containment with hydraulic control) would address both Pitch Material LNAPL in that it would isolate these contaminants from potential contact with site workers, and protect the receptor (surface water – Morses Creek). This approach is consistent with the NJDEP approved Remedial Strategy Road Map and has been successfully implemented at the SLOU to address a large mass of product at the BRC.

Department Comment:

Pilot Program Completion Report: The Department disagrees with the Technical Impracticability claim for the entire Pitch Area, but special consideration for TI claims may be appropriate to limited areas of the site (i.e., SWL, IRPL and Crude Oil Boat lines). Therefore, any capping and wetland vegetation activities as a remedial action in the entirety

of the Environmentally Sensitive Natural Resources (ESNRs), to address free and residual product will not be an appropriate remedial action.

Response:
Capping and containment of free and residual product has been approved by the Department and successfully implemented at other locations at the BRC including the SLOU (IAOC L) and the 4-Landfill Area. As at these other areas, capping and containment of free and residual product in IAOC A18 is protective of human health and the environment in that the remedy prevents direct contact with contamination that is impracticable to remove or treat due to the magnitude and complexity of implementing a removal or treatment option. Additionally, the pathway for groundwater migration to wetlands or surface water bodies is eliminated through the installation of the barrier wall and impermeable cap layers. It is not clear how these two statements in this particular comment (one pertaining to TI claims around refinery infrastructure and the other pertaining to capping and wetland vegetation in an ESNR area) are related. Please clarify.

Department Comment:

Pilot Program Completion Report, Appendix 20: The conclusions of the report state "A key design parameter of sustainable vegetative growth is elevation and a key component of the pilot study was to establish the optimal elevation for wetland vegetative growth. The specific elevation range at which wetland plantings thrive is currently being evaluated and will be incorporated into a RAW and final design." If this is one of the remedial alternative's selected and once the optimal elevation for wetland vegetative growth is established, will there be a wetland planting proposal included in the RAW that will determine if the plants placed at the site will grow and thrive?

Response:
Both conceptual and detailed descriptions of proposed remedial actions will be included in a Remedial Action Workplan (RAW). The specific species of wetland vegetation will be selected during the final design and will be presented in the final design and permit applications. A proposed monitoring plan of the cap, including inspecting cap stabilizing vegetation will be included in the RAW. It should be noted that the remedy will isolate product and impacted soil from human and ecological receptors. Additionally, the remedy will prevent migration of contaminated ground water to surface water bodies and wetland through the construction of an impermeable cap, a hydraulic barrier wall, and hydraulic control system. The function of the wetland vegetation is solely for cap stabilization and is not intended to be the actual remedy.

Based on the NJDEP's responses to the Technical Impracticability Report, Pilot Program Completion Report, and Revised Feasibility Study Report Addendum, we are requesting a meeting by May 31, 2022 with all relevant NJDEP staff that were involved in the review of these documents and preparation of the January 28, 2022 email in order to review the above responses and to progress the remedial activities for this IAOC.

I may be reached at (703) 963-7132 should you have any questions.

Sincerely,

Maureen Forlenza
Team Lead Project Manager

Cc: S. Ferreira – USEPA (electronically)
M. Renzulli (electronically)
D. LaMond – Phillips 66 (electronically)
C. McCardell – GHD (electronically)
C. Cumming – NJDEP (electronically)
A. Motter – NJDEP (electronically)
S. Maybury – NJDEP (electronically)
N. Kalaigian – NJDEP (electronically)
I. Olguin-Lira – NJDEP (electronically)